Figure 1

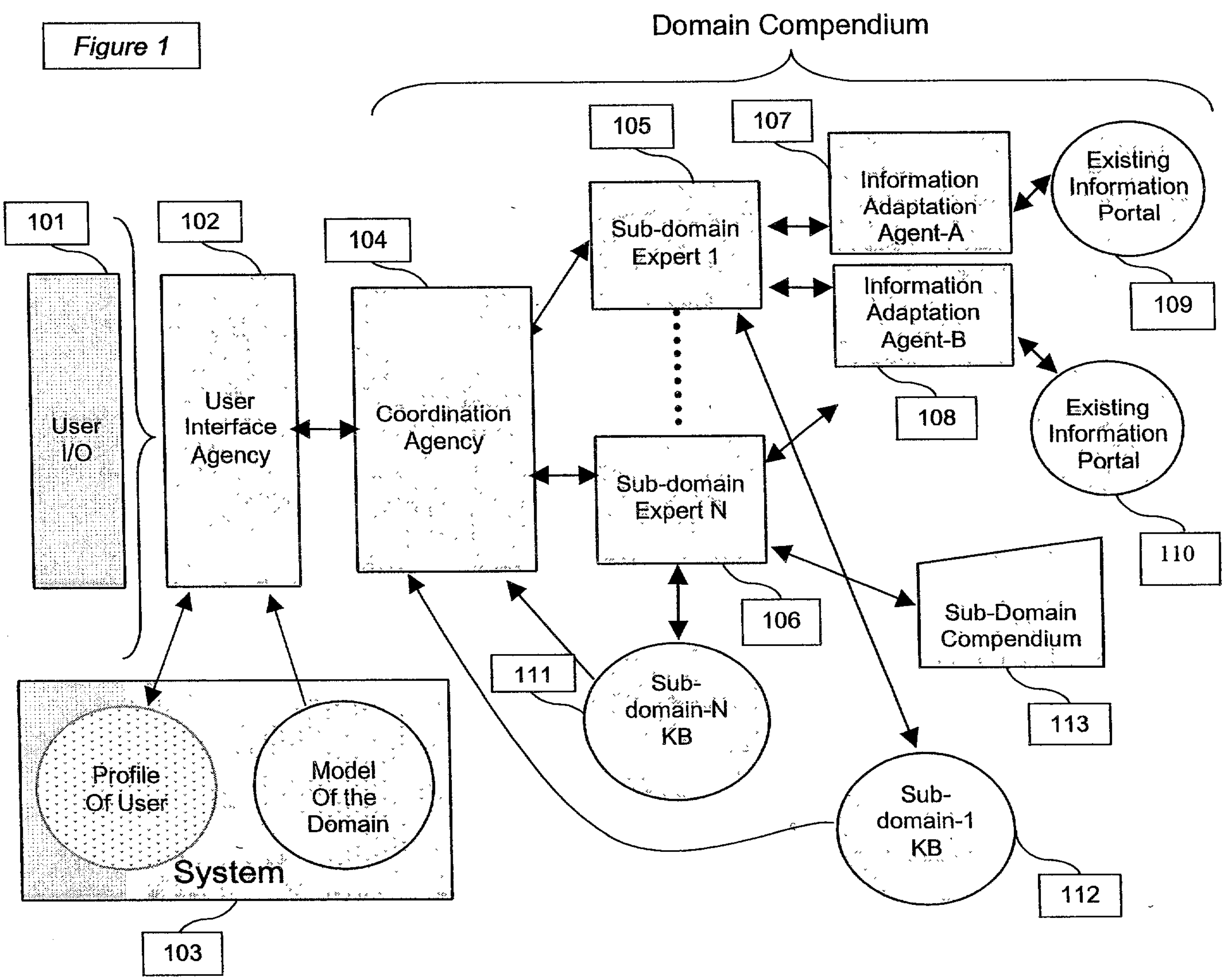
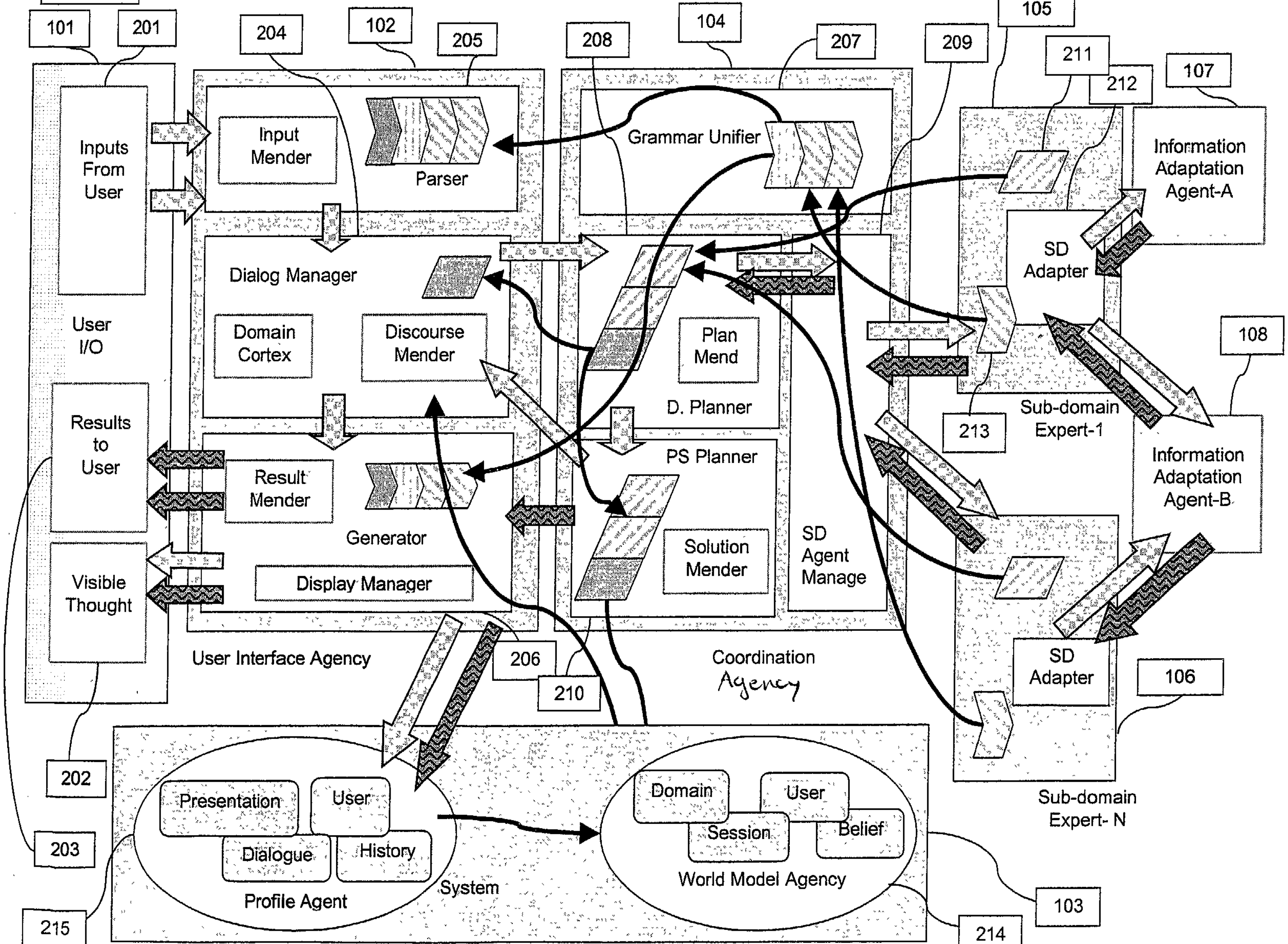
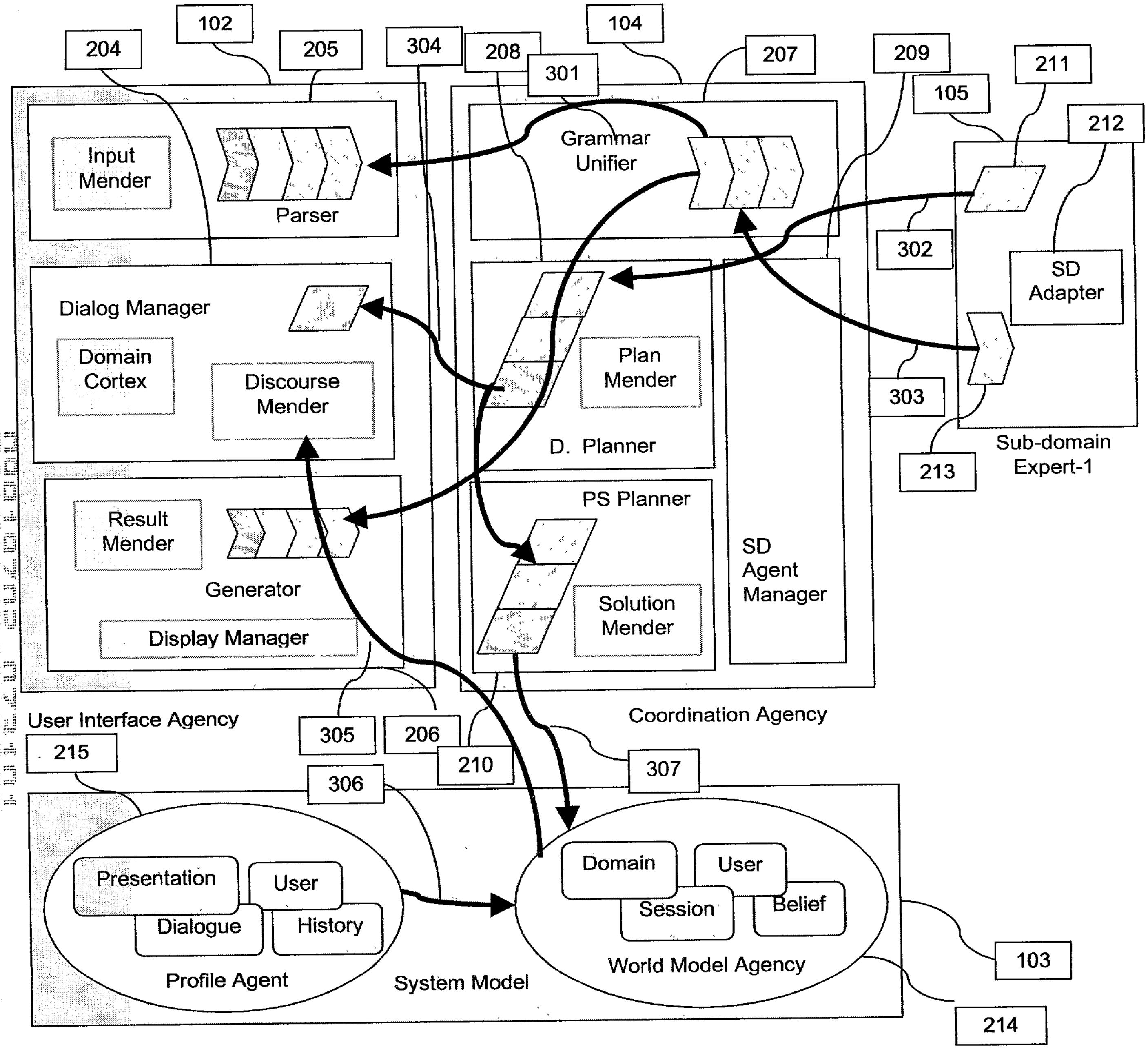

Domain Compendium
101
User I/O
102
User Interface Agency
103
System
Profile Of User
Model Of the Domain
104
Coordination Agency
105
Sub-domain Expert 1
106
Sub-domain Expert N
107
Information Adaptation Agent-A
108
Information Adaptation Agent-B
109
Existing Information Portal
110
Existing Information Portal
111
Sub-domain-N KB
112
Sub-domain-1 KB
113
Sub-Domain Compendium

Figure 2



101
201
Inputs From User
User I/O
Results to User
Visible Thought
202
203
204
102
205
Input Mender
Parser
Dialog Manager
Domain Cortex
Discourse Mender
Result Mender
Generator
Display Manager
User Interface Agency
206
210
208
104
207
Grammar Unifier
Plan Mend
D. Planner
PS Planner
Solution Mender
SD Agent Manage
Coordination Agency
209
105
211
212
107
SD Adapter
Information Adaptation Agent-A
213
Sub-domain Expert-1
108
Information Adaptation Agent-B
SD Adapter
106
Sub-domain Expert- N
Presentation
User
Dialogue
History
Profile Agent
System
Domain
User
Session
Belief
World Model Agency
215
214
103

Figure 3



204
102
205
304
208
301
104
207
209
211
105
212
Input
Mender
Parser
Grammar
Unifier
302
SD
Adapter
Dialog Manager
Domain
Cortex
Discourse
Mender
Plan
Mender
D. Planner
303
213
Sub-domain
Expert-1
Result
Mender
Generator
Display Manager
PS Planner
Solution
Mender
SD
Agent
Manager
User Interface Agency
215
305
206
210
Coordination Agency
307
306
Presentation
User
Dialogue
History
Profile Agent
System Model
Domain
User
Session
Belief
World Model Agency
103
214

Figure 4

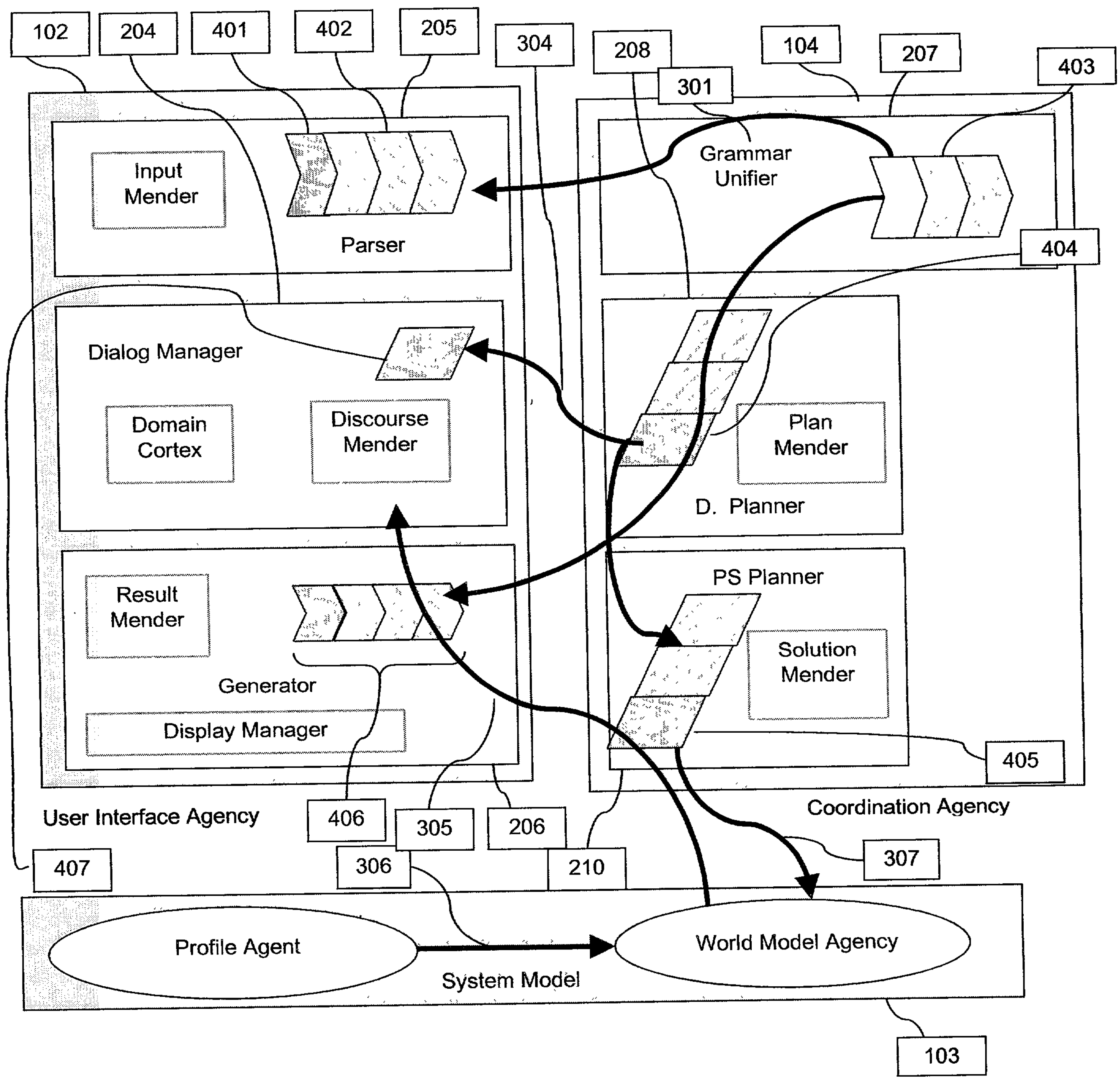
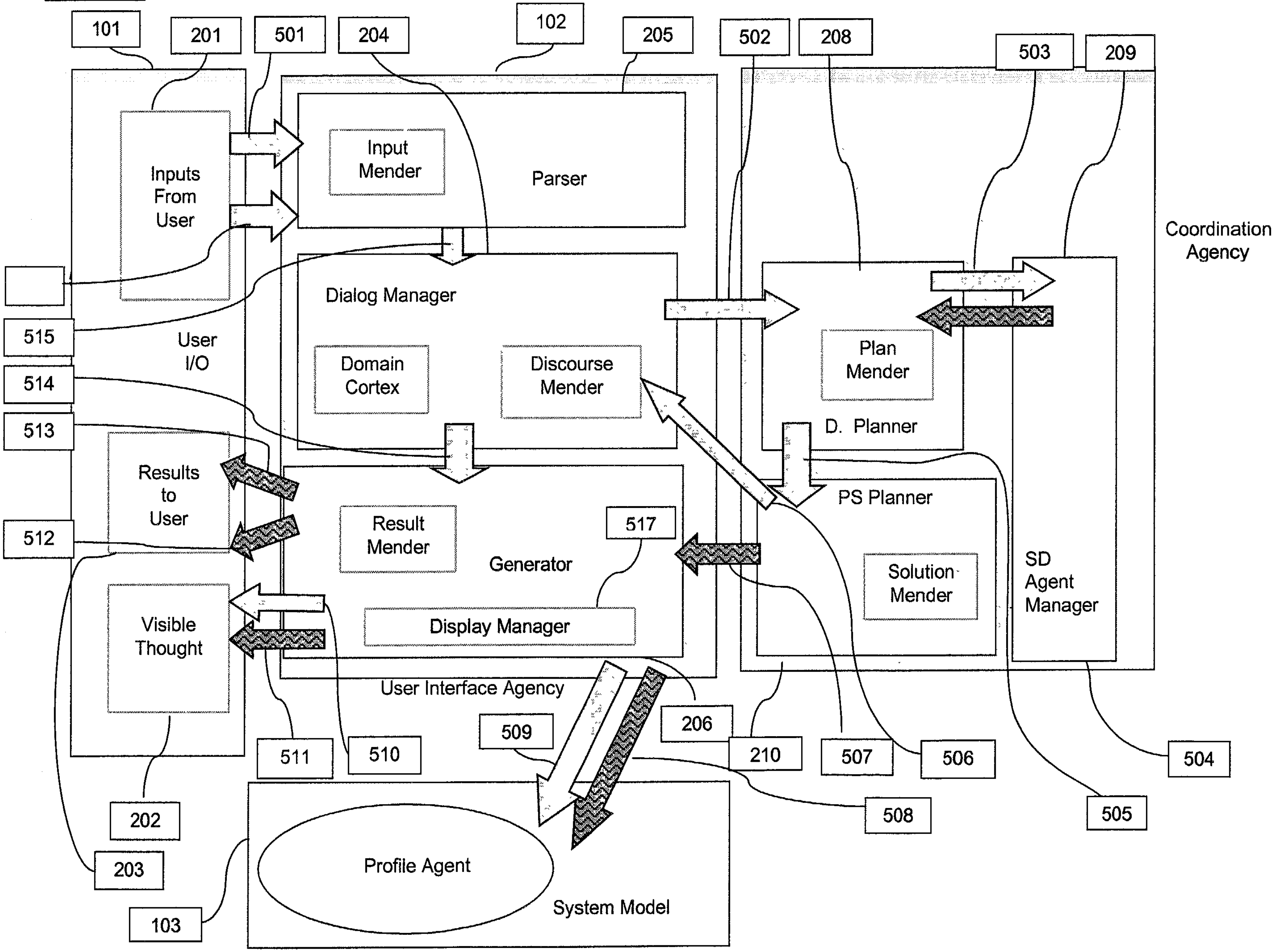

102
204
401
402
205
304
208
301
104
207
403
Input Mender
Parser
Grammar Unifier
404
Dialog Manager
Domain Cortex
Discourse Mender
Plan Mender
D. Planner
PS Planner
Result Mender
Generator
Solution Mender
Display Manager
405
User Interface Agency
406
305
206
Coordination Agency
407
306
210
307
Profile Agent
World Model Agency
System Model
103

Figure 5


101
201
501
204
102
205
502
208
503
209
Inputs From User
Input Mender
Parser
Dialog Manager
Domain Cortex
Discourse Mender
User I/O
515
514
513
512
Results to User
Visible Thought
Result Mender
Generator
517
Display Manager
User Interface Agency
Plan Mender
D. Planner
PS Planner
Solution Mender
SD Agent Manager
Coordination Agency
511
510
509
206
210
507
506
504
508
505
202
203
103
Profile Agent
System Model

5

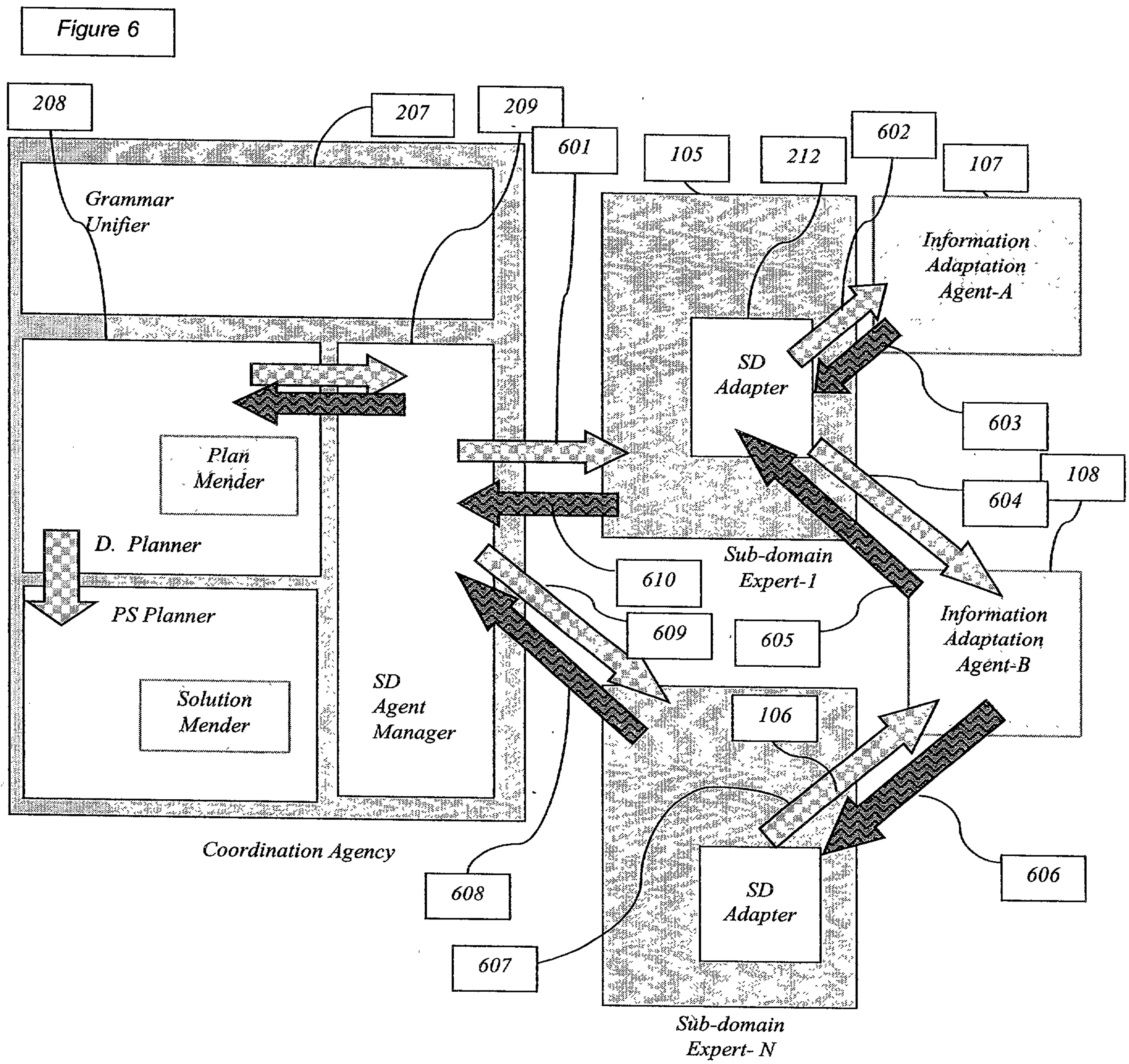
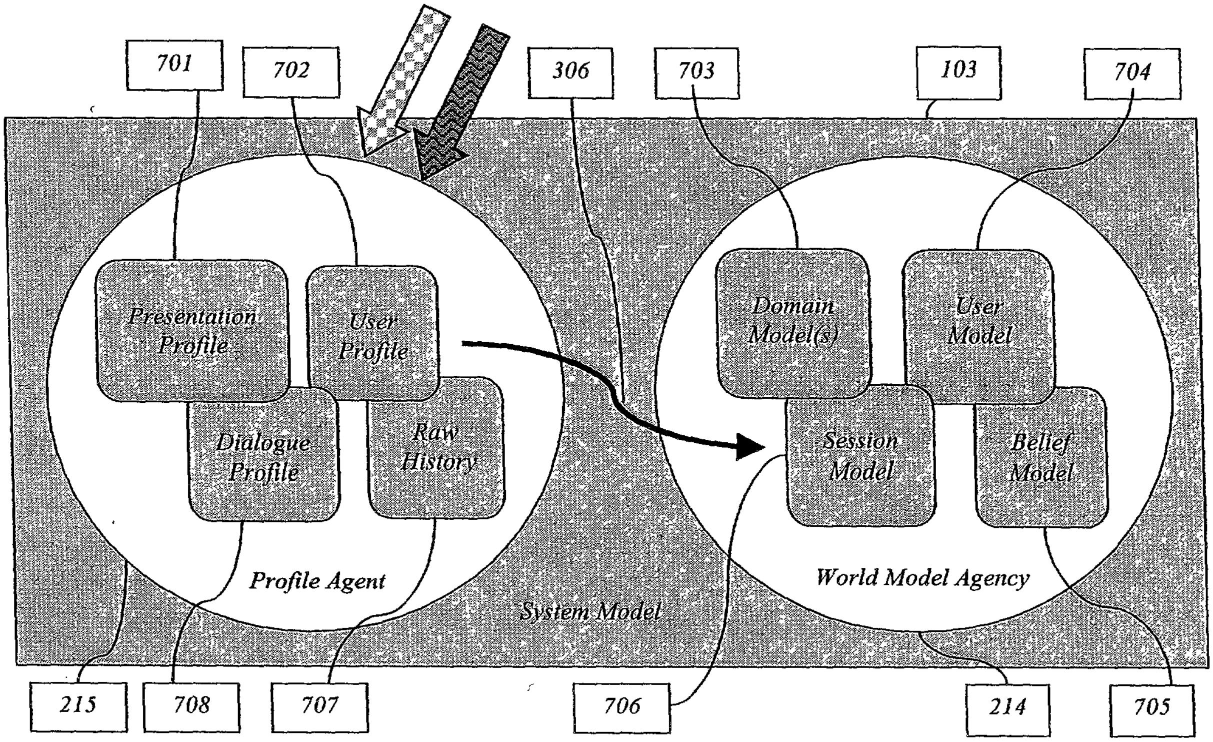


Figure 6
208
207
209
601
105
212
602
107
Grammar Unifier
Information Adaptation Agent-A
SD Adapter
Plan Mender
603
D. Planner
108
604
610
Sub-domain Expert-1
PS Planner
609
605
Information Adaptation Agent-B
Solution Mender
SD Agent Manager
106
Coordination Agency
606
608
SD Adapter
607
Sub-domain Expert- N

Figure 7



701
702
306
703
103
704
Presentation Profile
User Profile
Dialogue Profile
Raw History
Profile Agent
Domain Model(s)
User Model
Session Model
Belief Model
World Model Agency
System Model
215
708
707
706
214
705

Figure 8

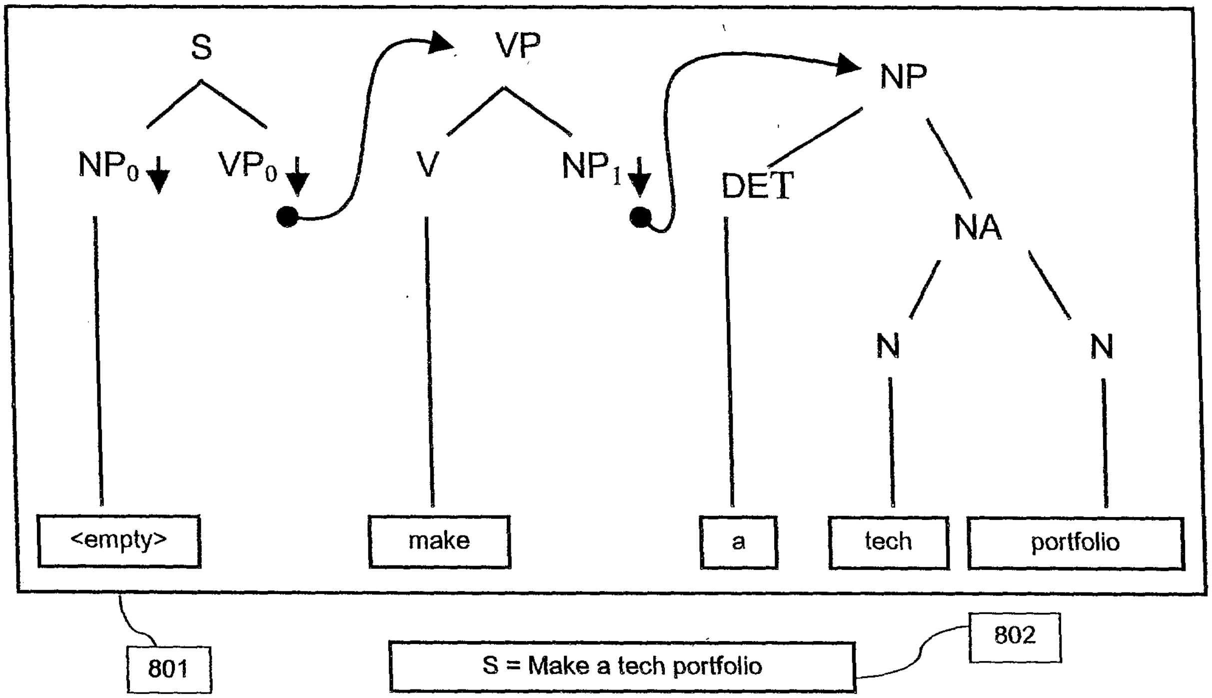


Figure 9

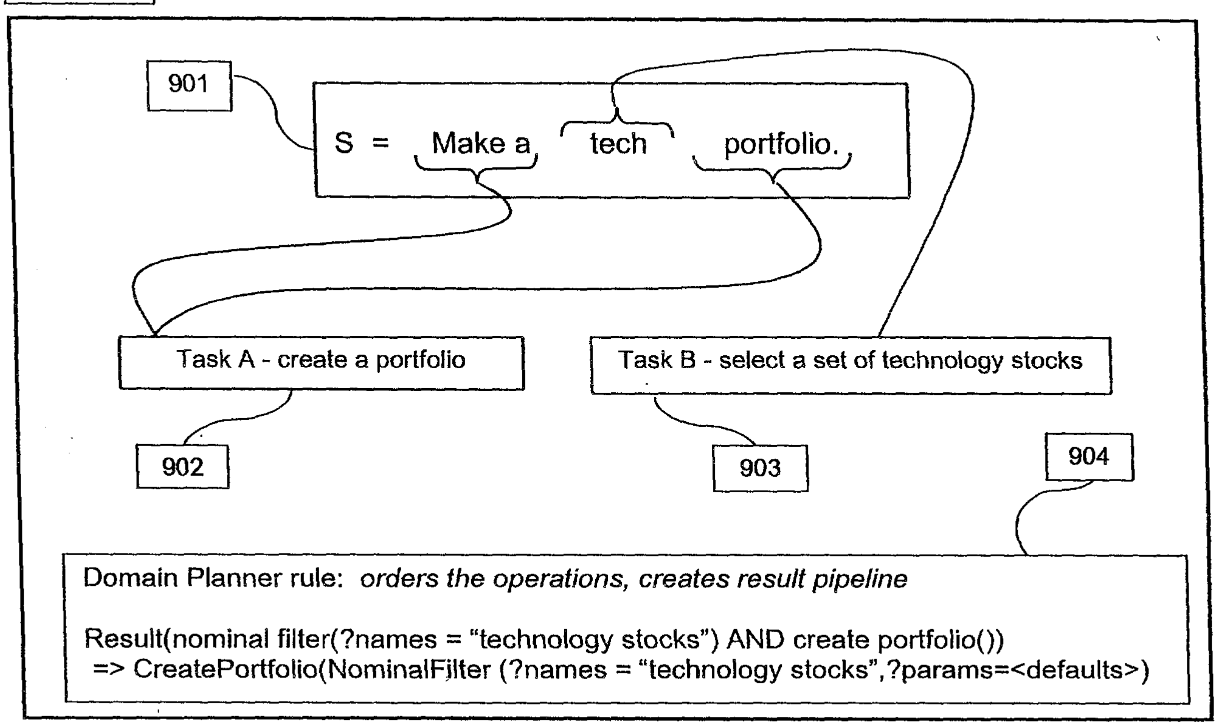


Figure 10

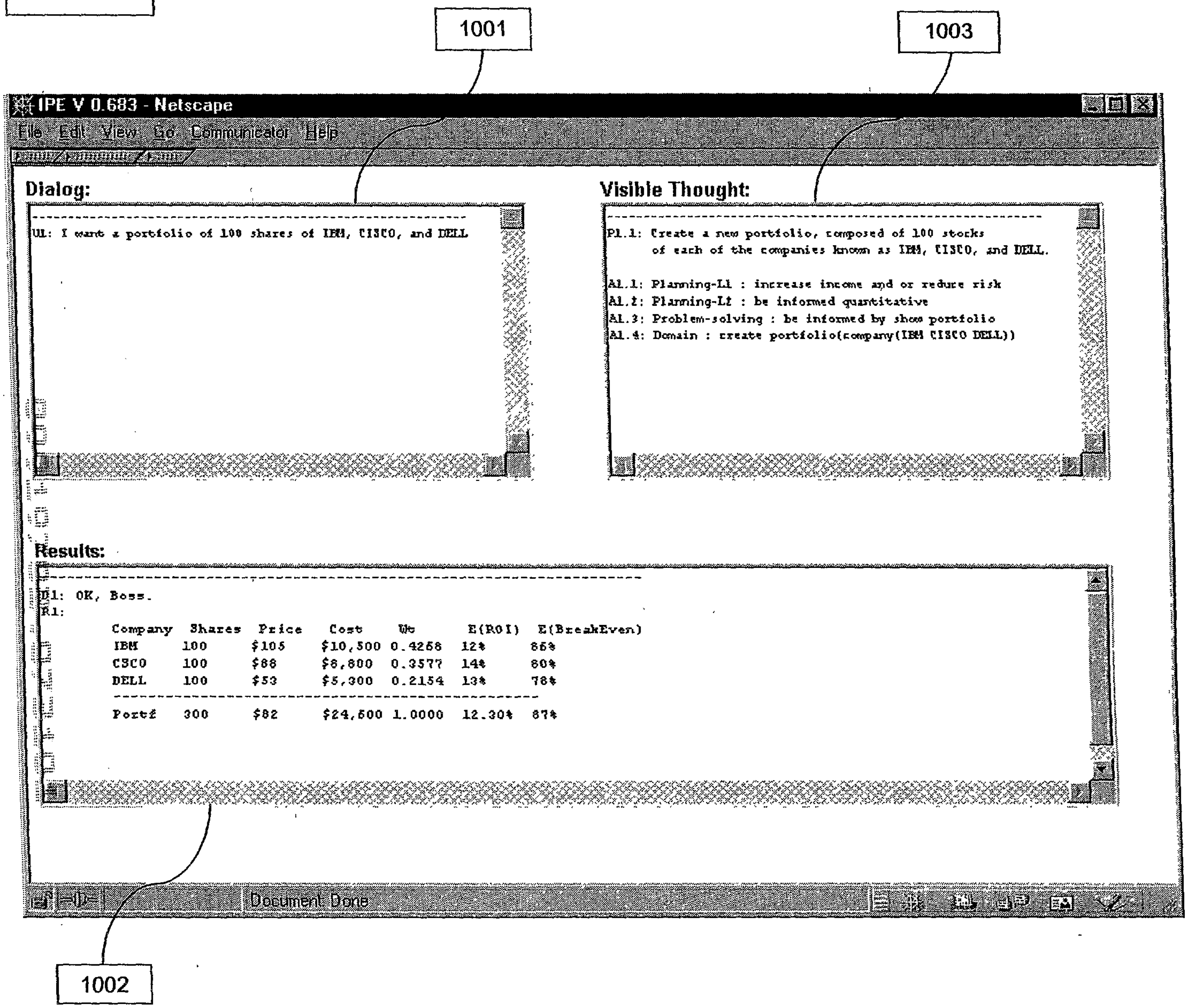

1001
1003
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
Visible Thought:
P1.1: Create a new portfolio, composed of 100 stocks of each of the companies known as IBM, CISCO, and DELL.
A1.1: Planning-L1 : increase income and or reduce risk
A1.2: Planning-L2 : be informed quantitative
A1.3: Problem-solving : be informed by show portfolio
A1.4: Domain : create portfolio(company(IBM CISCO DELL))
Results:
D1: OK, Boss.
R1:
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 100 $105 $10,500 0.4268 12% 86%
CSCO 100 $88 $8,800 0.3577 14% 80%
DELL 100 $53 $5,300 0.2154 13% 78%
Portf 300 $82 $24,600 1.0000 12.30% 87%
Document: Done
1002

Figure 11

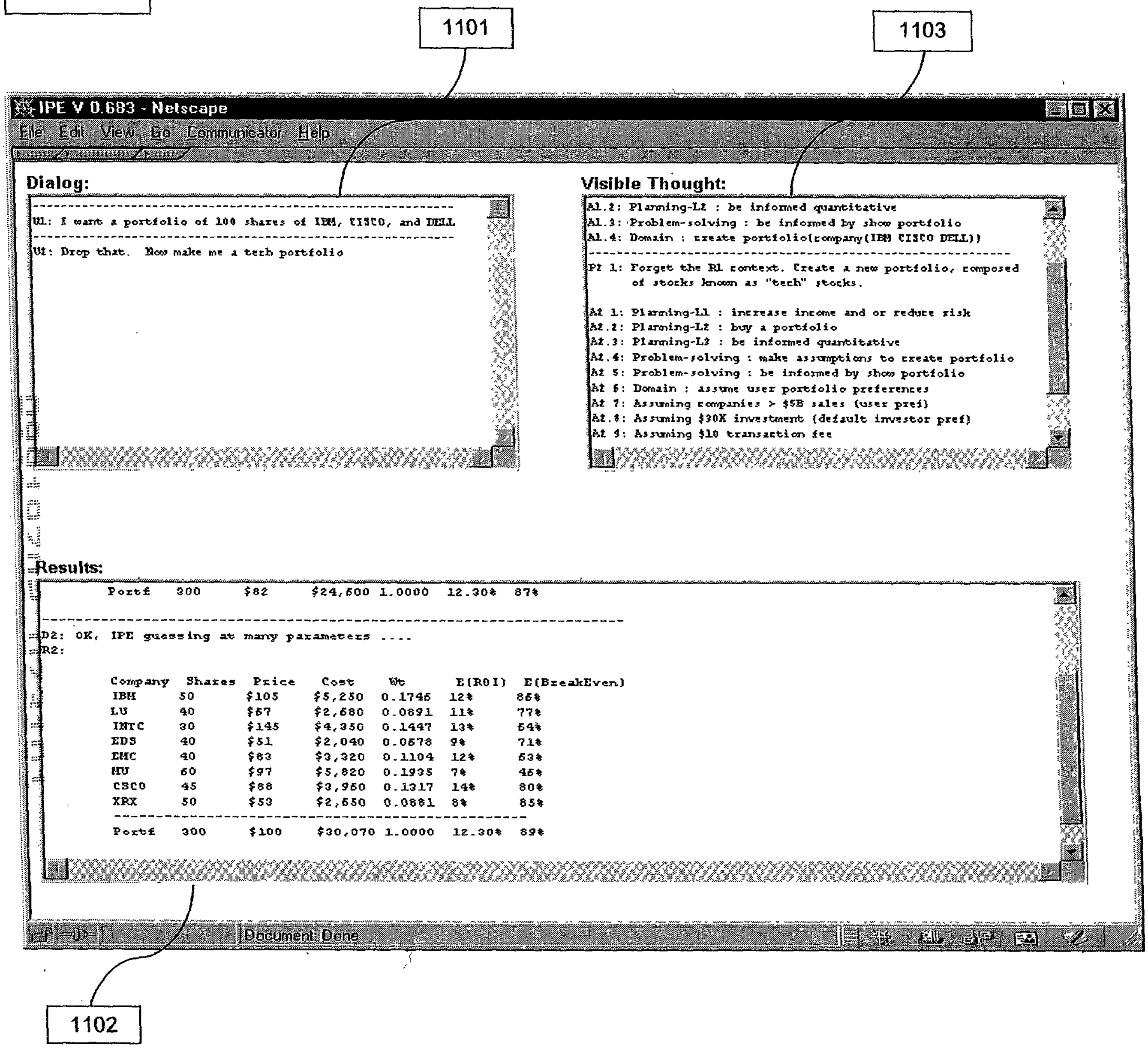

1101
1103
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2: Drop that. Now make me a tech portfolio
Visible Thought:
A1.2: Planning-L2 : be informed quantitative
A1.3: Problem-solving : be informed by show portfolio
A1.4: Domain : create portfolio(company(IBM CISCO DELL))
P2 1: Forget the R1 context. Create a new portfolio, composed of stocks known as "tech" stocks.
A2 1: Planning-L1 : increase income and or reduce risk
A2.2: Planning-L2 : buy a portfolio
A2.3: Planning-L3 : be informed quantitative
A2.4: Problem-solving : make assumptions to create portfolio
A2 5: Problem-solving : be informed by show portfolio
A2 6: Domain : assume user portfolio preferences
A2 7: Assuming companies > $5B sales (user pref)
A2.8: Assuming $30K investment (default investor pref)
A2 9: Assuming $10 transaction fee
Results:
Portf 300 $82 $24,600 1.0000 12.30% 87%
D2: OK, IPE guessing at many parameters ....
R2:
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 50 $105 $5,250 0.1746 12% 86%
LU 40 $67 $2,680 0.0891 11% 77%
INTC 30 $145 $4,350 0.1447 13% 64%
EDS 40 $51 $2,040 0.0678 9% 71%
EMC 40 $83 $3,320 0.1104 12% 63%
MU 60 $97 $5,820 0.1935 7% 46%
CSCO 45 $88 $3,960 0.1317 14% 80%
XRX 50 $53 $2,650 0.0881 8% 85%
Portf 300 $100 $30,070 1.0000 12.30% 89%
Document: Done
1102

Figure 12

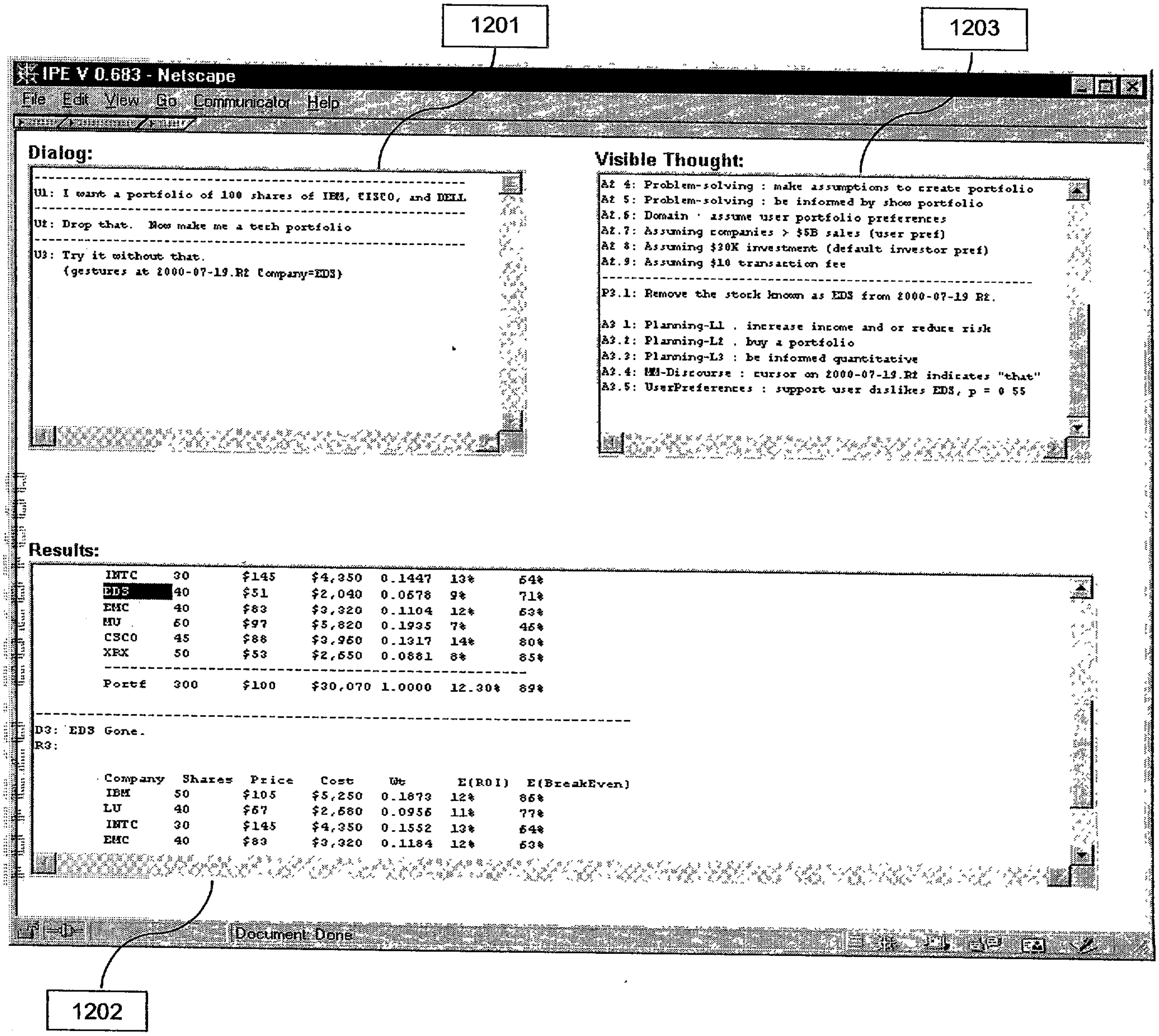

1201
1203
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2: Drop that. Now make me a tech portfolio
U3: Try it without that.
{gestures at 2000-07-19.R2 Company=EDS}
Visible Thought:
A2 4: Problem-solving : make assumptions to create portfolio
A2 5: Problem-solving : be informed by show portfolio
A2.6: Domain · assume user portfolio preferences
A2.7: Assuming companies > $5B sales (user pref)
A2 8: Assuming $30K investment (default investor pref)
A2.9: Assuming $10 transaction fee
P3.1: Remove the stock known as EDS from 2000-07-19 R2.
A3 1: Planning-L1 . increase income and or reduce risk
A3.2: Planning-L2 . buy a portfolio
A3.3: Planning-L3 : be informed quantitative
A3.4: MM-Discourse : cursor on 2000-07-19.R2 indicates "that"
A3.5: UserPreferences : support user dislikes EDS, p = 0 55
Results:
INTC 30 $145 $4,350 0.1447 13% 64%
EDS 40 $51 $2,040 0.0678 9% 71%
EMC 40 $83 $3,320 0.1104 12% 63%
MU 60 $97 $5,820 0.1935 7% 46%
CSCO 45 $88 $3,960 0.1317 14% 80%
XRX 50 $53 $2,650 0.0881 8% 85%
Portf 300 $100 $30,070 1.0000 12.30% 89%
D3: EDS Gone.
R3:
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 50 $105 $5,250 0.1873 12% 86%
LU 40 $67 $2,680 0.0956 11% 77%
INTC 30 $145 $4,350 0.1552 13% 64%
EMC 40 $83 $3,320 0.1184 12% 63%
Document: Done
1202

Figure 13

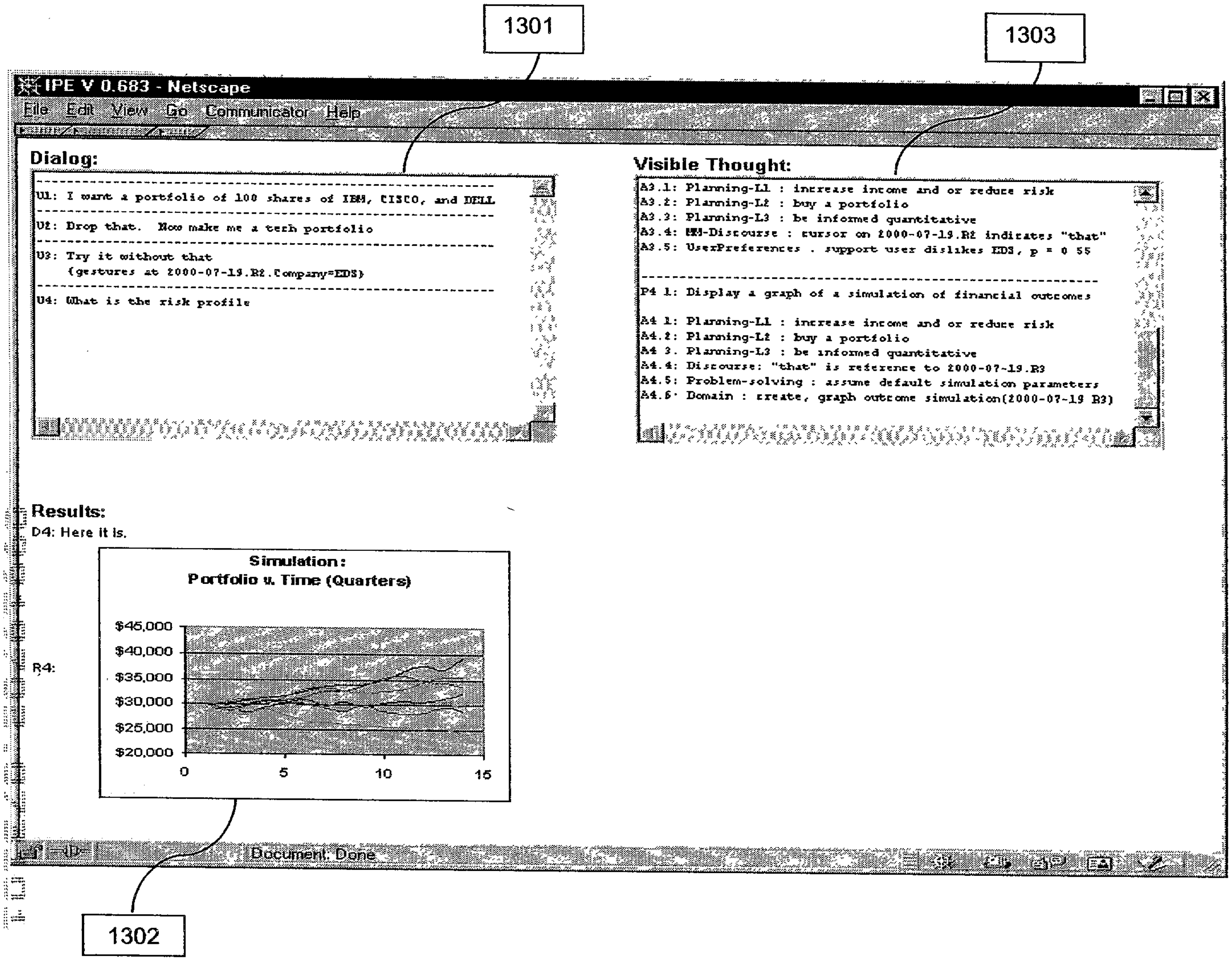

1301
1303
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2: Drop that. Now make me a tech portfolio
U3: Try it without that
{gestures at 2000-07-19.R2.Company=EDS}
U4: What is the risk profile
Visible Thought:
A3.1: Planning-L1 : increase income and or reduce risk
A3.2: Planning-L2 : buy a portfolio
A3.3: Planning-L3 : be informed quantitative
A3.4: MM-Discourse : cursor on 2000-07-19.R2 indicates "that"
A3.5: UserPreferences . support user dislikes EDS, p = 0 55
P4 1: Display a graph of a simulation of financial outcomes
A4 1: Planning-L1 : increase income and or reduce risk
A4.2: Planning-L2 : buy a portfolio
A4 3. Planning-L3 : be informed quantitative
A4.4: Discourse: "that" is reference to 2000-07-19.R3
A4.5: Problem-solving : assume default simulation parameters
A4.6· Domain : create, graph outcome simulation(2000-07-19 R3)
Results:
D4: Here it is.
R4:
Simulation:
Portfolio v. Time (Quarters)
$45,000
$40,000
$35,000
$30,000
$25,000
$20,000
0
5
10
15
Document: Done
1302

Figure 14

1401

hist.txt - Notepad

File Edit Search Help

==

T1: 2000-07-19:23:32:01

U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL

P1.1: Create a new portfolio, composed of 100 stocks
of each of the companies known as IBM, CISCO, and DELL.

A1.1: Planning-L1 : increase Income and or reduce risk
A1.2: Planning-L2 : be informed quantitative
A1.3: Problem-solving : be informed by show portfolio
A1.4: Domain : create portfolio(company(IBM CISCO DELL))

D1: OK, Boss.
R1:

Company	Shares	Price	Cost	Wt	E(ROI)	E(BreakEven)
IBM	100	$105	$10,500	0.4268	12%	86%
CSCO	100	$88	$8,800	0.3577	14%	80%
DELL	100	$53	$5,300	0.2154	13%	78%
Portf	300	$82	$24,600	1.0000	12.30%	87%

==

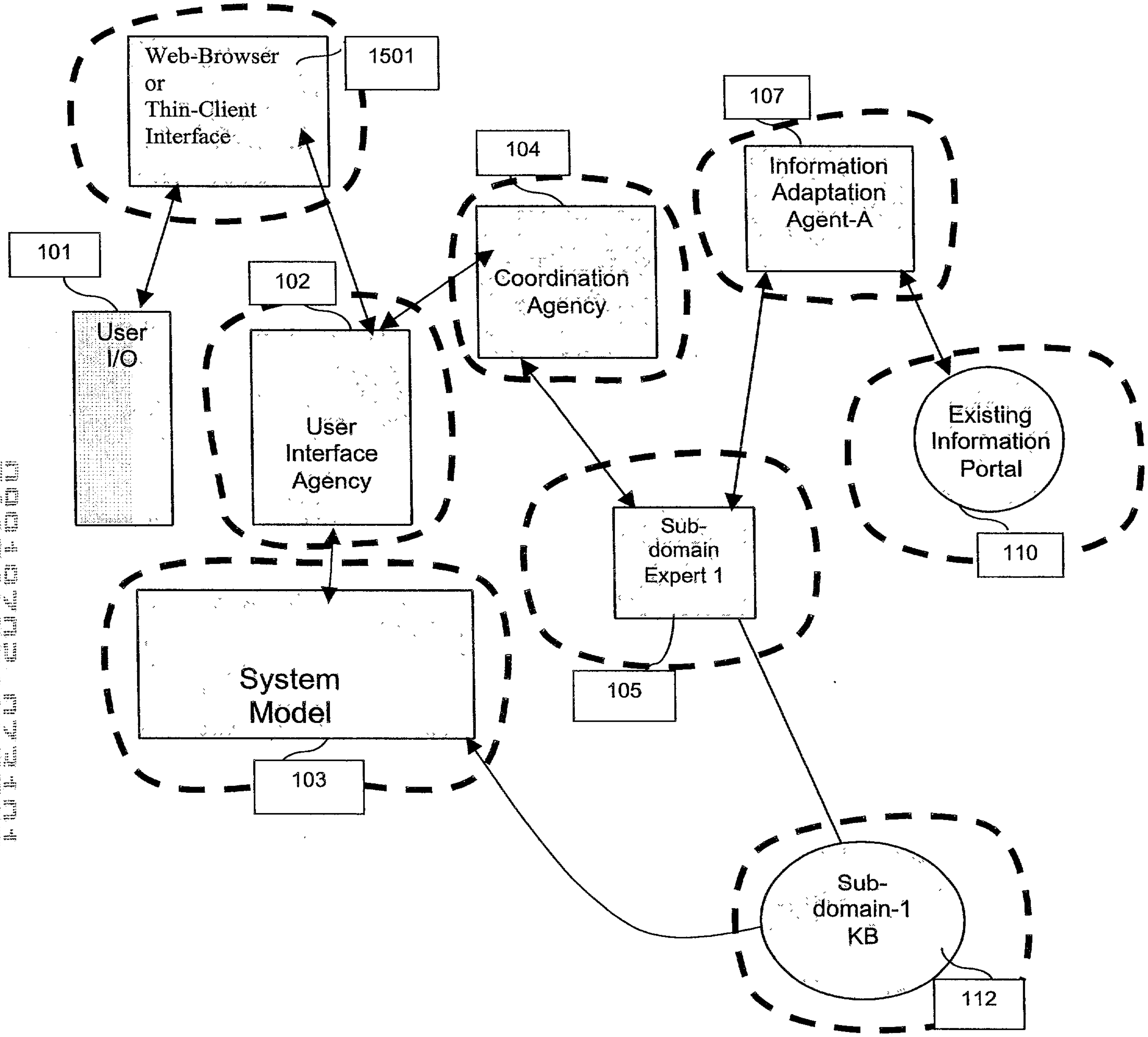
T1: 2000-07-19:24:53:20

U2: Drop that. Now make me a tech portfolio.

P2.1: Forget the R1 context. Create a new portfolio, composed
of stocks known as "tech" stocks.

A2.1: Planning-L1 : increase income and or reduce risk
A2.2: Planning-L2 : buy a portfolio
A2.3: Planning-L3 : be informed quantitative
A2.4: Problem-solving : make assumptions to create portfolio
A2.5: Problem-solving : be informed by show portfolio
A2.6: Domain : assume user portfolio preferences
A2.7: Assuming companies > $5B sales (user pref)

Figure 15



Web-Browser or Thin-Client Interface
1501
101
User I/O
102
User Interface Agency
104
Coordination Agency
107
Information Adaptation Agent-A
Existing Information Portal
110
Sub-domain Expert 1
105
System Model
103
Sub-domain-1 KB
112

Figure 16

Simplified Strength/Necessity Belief Calculus

1601

?X = Coffee if:

?X is in a mug (s = .2; n = 0)

?X is a hot liquid (s = .4; n = 0)

?X is brown (s = .6; n = .97) 1602

?X is not tea (s = .3; n = 1)

S = Strength; N = Necessity; B = Belief; D = Disbelief;
P = Belief measure of premise (input)

Belief Evaluation Recurrence Formulae :

$B_{x+1} = B_x + (1 - B_x) * S_{x+1} * P_{x+1}$; with $B_o = 0$

$D_{x+1} = D_x + (1 - D_x) * N_{x+1} * (1 - P_{x+1})$; with $D_o = 0$ 1603

Conclusion = $B_n * (1 - D_n)$;

Example A. **B_4 = 0.8656,**
given all 4 preconditions known to be true with absolute certainty.

Example B. **B_4 = 0.7648, D_4 = 0.485,**
Conclusion = 0.393872,
given that we are only 50% sure that the liquid is brown , but are convinced of all other facts (e.g. because the light is very dim….)

Bayesian Belief Calculus -

Bayes's rule states that :

$$p(A \mid B) = \text{Prob of event A, given event B}$$
$$= (\, p(A) \;*\, p(B \mid A)\,) \;/\; p(B)$$

If we know the probabilities B_i for *every* way that A may be realized, we may write:

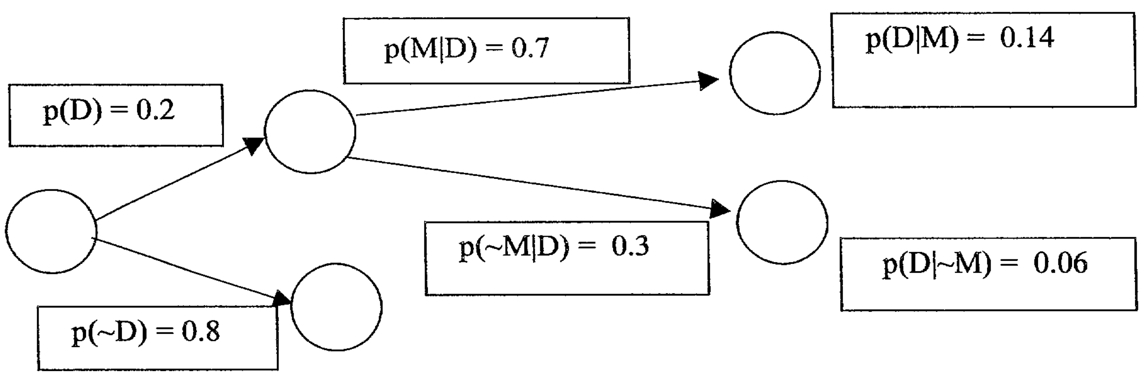
$$p(A) = \sum p(A \mid B_i)\; p(B_i)$$

Which allows a straightforward way to compute likelihood, when all possibilities are accounted for.

We can construct networks which relate Bayesian likelihood to various conditions. For example, consider the case where we are given

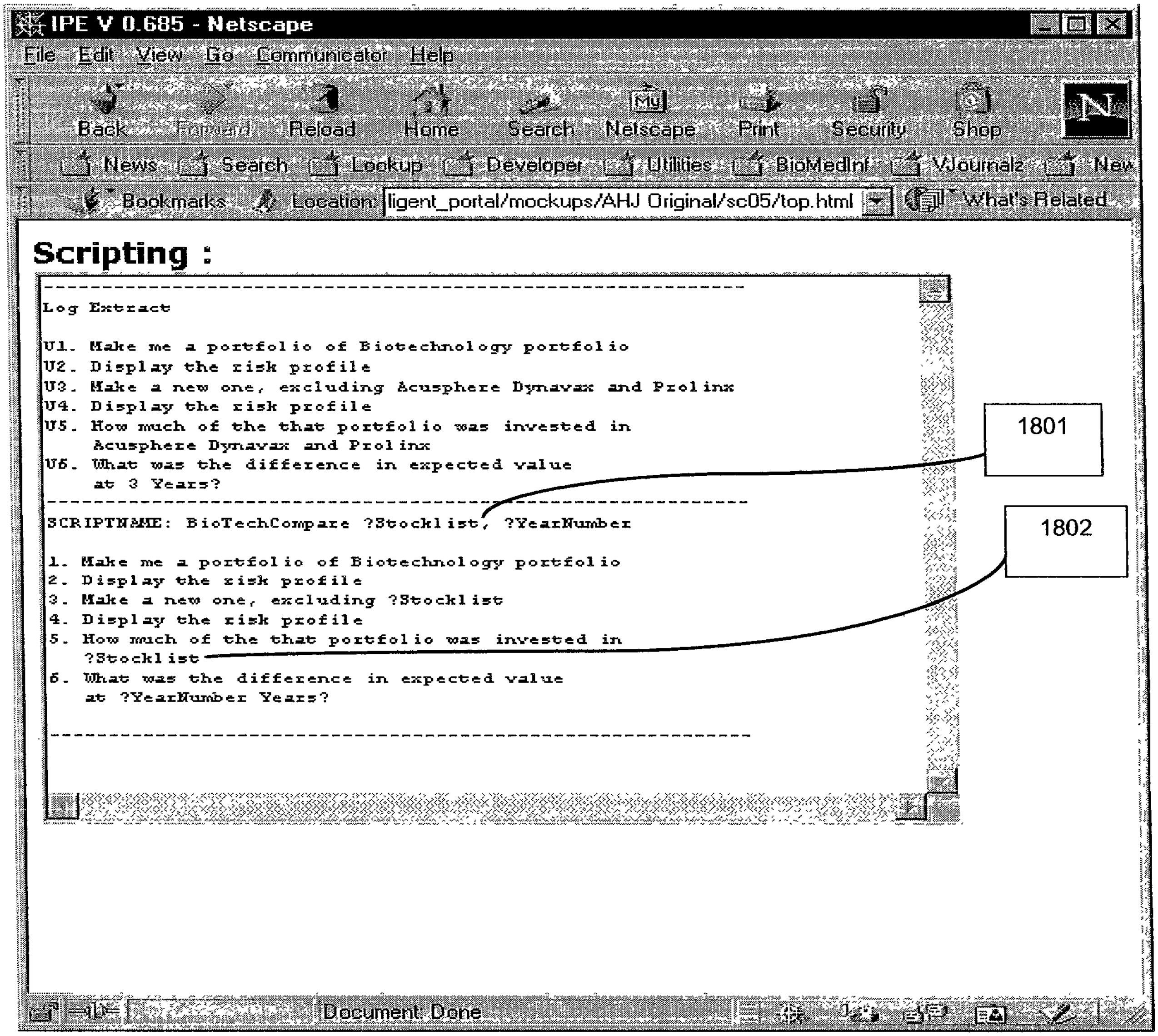
p(D) = probability of planning for retirement = 0.2, and
p(M | D) = probability of asking about mutual Funds, given D, = 0.7.

Now we can construct a graph of probabilistic influences that can be inferred:



This mechanism can be used to connect the probabilities of various plans and alternatives, and to infer likely plans from various communications.

Figure 18



IPE V 0.685 - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop
News Search Lookup Developer Utilities BioMedInf VJournalz New
Bookmarks Location: ligent_portal/mockups/AHJ Original/sc05/top.html What's Related
Scripting :
Log Extract
U1. Make me a portfolio of Biotechnology portfolio
U2. Display the risk profile
U3. Make a new one, excluding Acusphere Dynavax and Prolinx
U4. Display the risk profile
U5. How much of the that portfolio was invested in Acusphere Dynavax and Prolinx
U6. What was the difference in expected value at 3 Years?
SCRIPTNAME: BioTechCompare ?Stocklist, ?YearNumber
1. Make me a portfolio of Biotechnology portfolio
2. Display the risk profile
3. Make a new one, excluding ?Stocklist
4. Display the risk profile
5. How much of the that portfolio was invested in ?Stocklist
6. What was the difference in expected value at ?YearNumber Years?
1801
1802
Document: Done